In the Claims:

Claims 1-27 (Canceled).

28. (Original) A semiconductor device, comprising:

a semiconductor substrate having a drift region of first conductivity type therein and transition region of first conductivity type that extends between the drift region and a first surface of said semiconductor substrate and has a vertically retrograded first conductivity type doping profile therein that peaks at a first depth relative to the first surface;

first and second shielding regions of second conductivity type that extend in the drift region and define respective P-N junctions with the transition region, said first and second shielding regions extending laterally towards each other in a manner that constricts a neck of the transition region to a minimum width at a second depth relative to the first surface; and

an anode electrode that extends on the first surface of said semiconductor substrate and defines a Schottky rectifying junction with the transition region.

29. (Currently amended) The device of Claim 28, wherein a product of a [[the]] peak first conductivity type dopant concentration in the transition region and a width of the transition region at the first depth is in a range between about $1x10^{12}$ cm^{-2} and about $7x10^{12}$ cm^{-2}.

30. (Currently amended) The device of Claim 28, wherein a product of a [[the]] peak first conductivity type dopant concentration in the transition region and a width of the transition region at the first depth is in a range between about $3.5x10^{12}$ cm^{-2} and about $6.5x10^{12}$ cm^{-2}.

31. (New) A vertical power device, comprising:

a semiconductor substrate having a drift region of first conductivity type therein and a transition region of first conductivity type that extends between the drift region and a first surface of said semiconductor substrate, said transition region having a vertically retrograded first conductivity type doping profile therein that peaks at a first depth relative to the first surface;

first and second base regions of second conductivity type that extend in said semiconductor substrate and define respective P-N junctions with opposing sides of said transition region;

first and second source regions of first conductivity type in said first and second base regions, respectively;

first and second base shielding regions of second conductivity type that are more highly doped than said first and second base regions and extend laterally towards each other in said semiconductor substrate to thereby constrict a neck of said transition region to a minimum width at a second depth relative to the first surface; and

an electrode that extends on the first surface and defines a Schottky rectifying junction with said transition region.

32. (New) The device of Claim 31, wherein a product of a peak first conductivity type dopant concentration in said transition region and a width of said transition region at the first depth is in a range between about $1x10^{12}$ cm^{-2} and about $7x10^{12}$ cm^{-2}.

33. (New) The device of Claim 31, wherein a product of a peak first conductivity type dopant concentration in said transition region and a width of said transition region at the first depth is in a range between about $3.5x10^{12}$ cm^{-2} and about $6.5x10^{12}$ cm^{-2}.

34. (New) The device of Claim 31, further comprising:

a second transition region that extends between the first surface and the drift region and defines a P-N junction with said first base region; and

an insulated gate electrode of a MOSFET that extends opposite said second transition region.

35. (New) A vertical power device, comprising:

a semiconductor substrate having a drift region of first conductivity type therein and a transition region of first conductivity type that extends between the drift region and a first surface of said semiconductor substrate;

first and second regions of second conductivity type that form respective P-N junctions with opposing sides of said transition region and constrict a neck of said transition region to a minimum width at a first depth that is greater than about 0.25 microns relative to the first surface; and

an anode electrode that extends on the first surface and defines a Schottky rectifying junction with said transition region; and

wherein a product of a first conductivity type dopant concentration in said transition region at the first depth and a width of said transition region at the first depth is in a range between about $1x10^{12}$ cm^{-2} and about $7x10^{12}$ cm^{-2}.

36. (New) The device of Claim 35, wherein the product is in a range between about $3.5x10^{12}$ cm^{-2} and about $6.5x10^{12}$ cm^{-2}.

37. (New) The device of Claim 35, further comprising:

a second transition region that extends between the first surface and the drift region and defines a P-N junction with said first region of second conductivity type; and

an insulated gate electrode of a MOSFET that extends opposite said second transition region.

38. (New) A Schottky diode, comprising:

a semiconductor substrate having a region of first conductivity type therein that extends to a first surface thereof;

first and second shielding regions of second conductivity type that form respective P-N junctions with opposing sides of the region of first conductivity type and constrict a neck of the first region of first conductivity type to first width at a first depth relative to the first surface; and

an electrode that extends on the first surface and defines a Schottky rectifying junction with the region of first conductivity type and an ohmic contact with said first and second shielding regions; and

wherein a product of a first conductivity type dopant concentration in the region of first conductivity type and the first width is in a range between about $1x10^{12}$ cm^{-2} and about $7x10^{12}$ cm^{-2}.

39. (New) The Schottky diode of Claim 38, wherein the product is in a range between about $3.5x10^{12}$ cm^{-2} and about $6.5x10^{12}$ cm^{-2}.

40. (New) The Schottky diode of Claim 38, wherein the first depth is greater than about 0.25 microns.